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10/541,380

07/06/2005

Motohiro Arifuku

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EXAMINER

VIJAYAKUMAR, KALLAMBELLA M

ART UNIT

PAPER NUMBER

1793

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/541,380	<b>Applicant(s)</b> ARIFUKU ET AL.	
	<b>Examiner</b> KALLAMBELLA VIJAYAKUMAR	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☒ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                        |                                                                   |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>01/28/2009; 04/28/2006; 07/06/2005</u> .                      | 6) <input type="checkbox"/> Other: _____                          |



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#### **DETAILED ACTION**

- This application is a 371 of PCT/JP04/08896 filed 06/24/2004. Acknowledgment is made of applicant's claim for foreign priority based on an application filed JP 2003-181593 on 06/25/2003. It is noted, however, that applicant has not filed a certified copy of the JP 2003-181593 application as required by 35 U.S.C. 119(b).
- Applicant's election without traverse of Group-I, Claims 1-9 and 19 in the reply filed on 11/06/2008 is acknowledged, which are currently pending with the application. Claims 10-18 were cancelled.
- The information disclosure statement (IDS) submitted on 01/28/2009, 04/28/2006, and 07/06/2005 have been considered by the examiner.

#### ***Claim Rejections - 35 USC § 102***

#### ***Claim Rejections - 35 USC § 103***

- The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.
- The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which

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said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

### Claim Interpretation

The recitation of "*which is used to connect a first circuit member ... formed such that these layers are thicker than said circuit electrodes on the basis of said main surface in at least one of said first and second circuit members,*" in claim-1 and "*for manufacturing a circuit member connecting structure ...so that these layers are thicker than said circuit electrodes on the basis of the main surface of the circuit board in at least one of said first and second circuit members,*" in claim-19 have been given little patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478,481 (CCPA 1951).

In the instant case, the preamble merely recites the intended use of the composition/method, wherein the prior art can meet this future limitation by merely being capable of such intended use.

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1. Claims 1-9 and 19 are rejected under 35 U.S.C. 102(b) as anticipated by, or in the alternative under 35 U.S.C. 103(a) as obvious over Watanabe et al (EP 979854).

Watanabe et al teach a circuit-connecting material which is interposed between circuit electrodes facing each other and electrically connects the electrodes in the pressing direction by Pressing the facing electrodes against each other; the circuit-connecting material comprising as essential components (1) a curing agent capable of generating free radicals upon heating, (2) a hydroxyl- group-containing resin having a molecular weight of 10,000 or more and (3) a radical-polymerizable substance, and (4) a conductive particle (Abstract; Example-1). The radical polymerizable substances were monomers/oligomers of acrylates (P-0036; 39) and maleimide compounds (0037). The hydroxyl containing resins included epoxy, and the resins had a Tg of 40C or higher (0040, 42). The film-forming phenoxy resin was included in the cured product to attain flexibility and toughness (P-0059). The conductive particles were polymer particles surface coated with 10 nm or larger of Au or 30 nm or larger of Ni (P-0082).

A specific example comprised of a 35 micron film formed from a composition comprising phenoxy resin <film former>, trihydroxyethyl glycol dimethacrylate <radical-polymerizable substance>, t-hexylperoxy-2-ethyl hexanoate <free-radical-generating agent>, polystyrene-core particles surface coated with nickel layers of 0.2 micron thick and an over coat of gold layers of 0.04 micron, and with an average diameter of 5 micron (P-0104-0108; 0126-Ex-12). The example-18 teaches a composition containing 2 micron particles coated with 40 nm Pd layer (P-0140), and "[W]hen, as by a recitation of ranges or otherwise, a claim covers several compositions, the claim is anticipated' if one of them is in the prior art." Titanium Metals Corp. v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (citing In re Petering, 301 F.2d 676, 682, 133 USPQ 275, 280 (CCPA 1962)) (emphasis in original). The example-16 teaches the composition containing diallylbisphenol-A (P-0134-0137).

With regard to the properties of the conductive particle in claim-1, and the cured product in claims 1 and 6, the prior art product, composition and the components are either same or substantially same as that claimed by the applicants and having same utility as the interconnecting material and Where the claimed and prior art products are identical or

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substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). The film was interposed between two FPC's each having 500 lines of Cu circuits which were connected to each other by heating and pressing (P-0109). All the limitations of the instant claims are met.

The reference is anticipatory.

In the alternative that the disclosure by Watanabe et al be insufficient to anticipate the instant claims, the instant claimed composition and method steps nonetheless would have been obvious to a person of ordinary skilled in the art over the disclosure because the reference teaches each of the claimed ingredients within the composition and a method of using it, and it has the same common utility as connecting material. The burden is upon the applicant to prove otherwise. In re Fitzgerald, 619 F.2d 67, 205 USPQ594 (CCPA 1980).

1. Claims 1-9 and 19 are rejected under 35 U.S.C. 103(a) as obvious over Yamada et al (EP 996321).

Yamada et al teach the composition of an anisotropically electrically conductive film with a thickness of 75 micron comprising a dispersion of electrically conductive particles in a binder matrix of a mixture of epoxies and a curing agent (Title, Abstract; Example-1: 0075-0079). The conductive particle comprised a mixture of 3-micron sized benzoguanamine core particles coated with Au/Ni, and 5-micron sized acryl/styrene resin core particles coated with Au/Ni. The thickness of surface gold layer was 10-30 nm (P-0023-24). The smaller conductive particles with an average particle size of  $3 \pm 0.5$  micron had a K-value (hardness) of at least 450 kgf/mm<sup>2</sup> (4.41 GPa), preferably at least 600 kgf/mm<sup>2</sup> (5.88 GPa), and the larger conductive particles with an average particle size of  $5 \pm 0.5$  micron had a K-value of 100 - 450 kgf/mm<sup>2</sup> (0.98-4.41 GPa), wherein the difference between the K-values for the smaller and larger particles should be at least 100 kgf/mm<sup>2</sup> (P-0029, 0031; Fig-2).

The prior art fails to teach the instant claimed hardness of the conductive particles per claim-1.

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However, the prior art range for K overlaps with the instant range of 1.961- 6.865 GPa, and In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

Pertaining to the properties after curing and the Tg in claims 1 and 6, the prior art composition and its components are similar to that claimed/taught by the applicants, and they are expected to possess same properties, because Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

Pertaining to claims 2-3, the prior art teaches polymers coated with Au with a shell thickness of 10-30 nm (P-0019) whose range either lies inside (claim-2) or overlaps (claim-3) with instant claimed ranges, and In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

Pertaining to claims 4-5, the prior art teaches binders of epoxy/epicoat and acrylic resin including hydroxyls and photo/thermal initiator/curing agents.

Pertaining to claims 7-8, the prior art teaches the addition of Phenoxy resin.

Pertaining to claim-9, the prior art teaches a film.

Pertaining to the method claim-19, the prior art teaches connecting interposing the connecting material film between an IC chip with bumps and substrate and thermally bonding at applied pressure forming an electrical connection through the particles (P-0058, 0080-82).

2. Claims 1-9 and 19 are rejected under 35 U.S.C. 103(a) as obvious over Saga et al (JP 2001-189171).

Saga et al teach an anisotropic conductive material in the form of a film comprising a dispersion of conductive films in an insulating binder (Claim-1). The insulating binder comprised

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of an epoxy resin such as epicoat and acrylic resin including hydroxyls (radical-polymerizable resin) (P-0010; 0036). The conductive particles in a specific example comprised of nickel plated benzoguanidine resin particles with a particle size of 5 microns (P-0036). The conductive particles were polymer particles of styrene, silicone, acrylic, and polyolefin and rubber particles surface coated with a metallic layer comprising one or at least two of Ni, Au, Ag, and Cu and like. The metallic layer had a thickness of 10-200 nm (P 0015-0016). The film thickness for gold was 10-30 nm. The composition contained photo/thermal curing agents such as imidazole, amine, acid anhydride (P-0011; 0036). The anisotropic composition further contained thermoplastic resin such as phenoxy resin (P-0013; film forming resin). The conductive particles had hardness of 1000-8000 N/mm<sup>2</sup> (1.0-8 GPa) (P-0020).

The prior art fails to teach the instant claimed hardness of the conductive particles or their particle size per claim-1.

However, the instant K (hardness) range of 1.961-6.865 GPa lies within prior art range of 1-8 GPa, and further teaches that the hardness, elasticity and the like can be appropriately selected (P-0013), and In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). The prior art particle size lies inside the instant claimed range, and In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

Pertaining to the properties after curing and the TG per claims 1 and 6, the prior art composition and its components are similar to that claimed/taught by the applicants, and they are expected to possess same properties, because Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

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Pertaining to claims 2-3, the prior art teaches polymers coated with Au with a shell thickness of 10-30 nm (P-0019) whose range overlaps with the instant claimed ranges and In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

Pertaining to claims 4-5, the prior art teaches polymers such as epoxy/epicoat and acrylic resin including hydroxyls and photo/thermal initiator/curing agents.

Pertaining to claims 7-8, the prior art teaches the addition of Phenoxy resin.

Pertaining to claim-9, the prior art teaches a film.

Pertaining to the method claim-19, the prior art teaches connecting a semiconductor element having an electrode at a position lower than a passivation film to a circuit substrate having an electrode corresponding to the electrode, including an insulating adhesive component and conductive particles (Claim-1). The prior art teaches interposing the connecting material film between an IC chip with an Al electrode and glass/epoxy substrate with Cu-electrode and thermally bonding at 180C and 150N forming an electrical connection through the particles (P-0036; Fig-1).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KALLAMBELLA VIJAYAKUMAR whose telephone number is (571)272-1324. The examiner can normally be reached on M-F 07-3.30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 5712721358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KMV/  
Feb 10, 2009.

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/Stanley Silverman/  
Supervisory Patent Examiner, Art Unit 1793